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(54) **Postage meter systems**

(57) A need exists for a postage meter system which incorporates means for enhancing the security of the collection and accounting of postal revenues printed by such postage meter systems so that a form of postage purchase can be achieved so that mailpieces processed by such systems may be posted anywhere at anytime.
 In a postage meter system wherein a printer is operable to print postage value onto successive security labels from a batch thereof, a method is disclosed for regulating the use of said system. The method comprises
 causing the postage meter system to output an output record comprising data representing the aggregate amount of postage printed by the printer and
 providing the user of the meter with a further batch of security labels only when the user provides the issuer of the labels with an output record including data representing the aggregate amount of postage printed by the printer on a previous batch of security labels.

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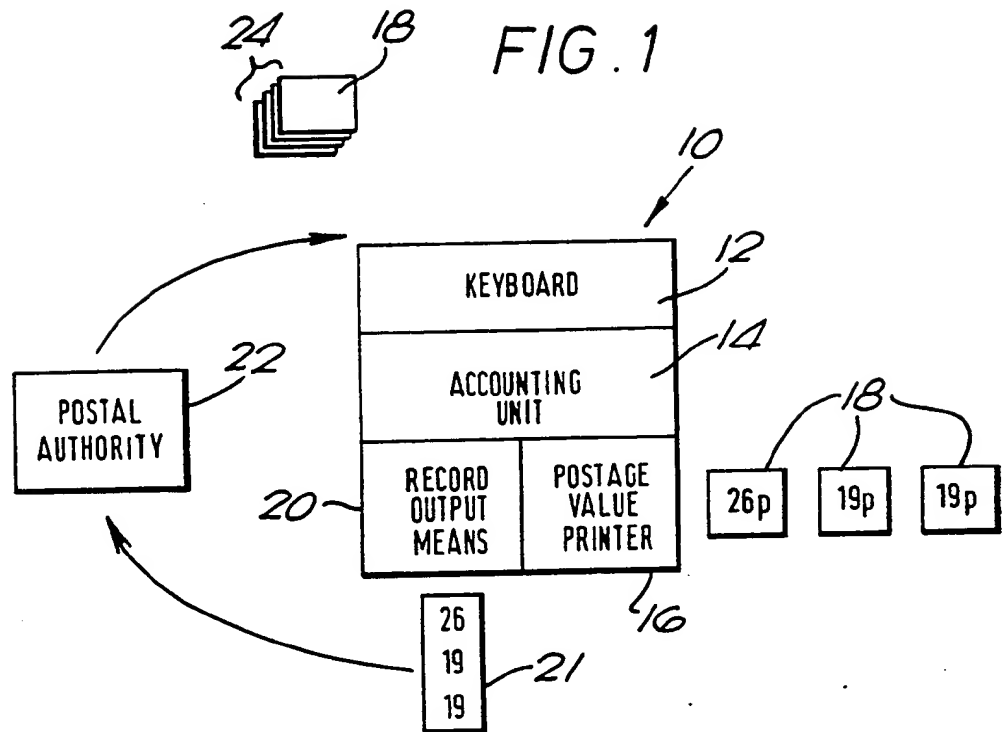
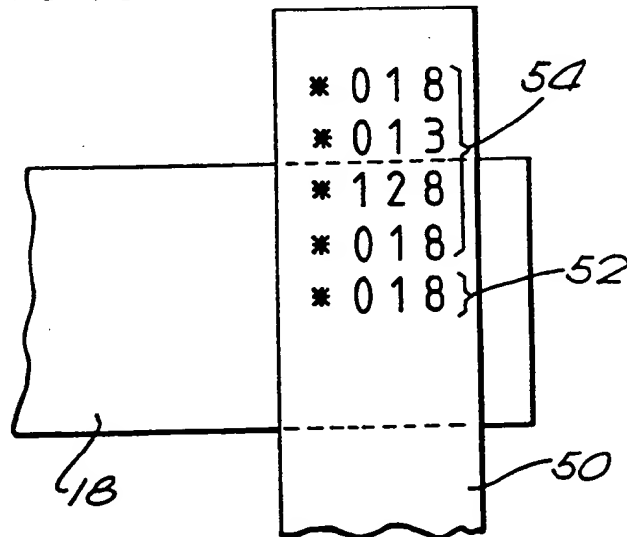


FIG. 5



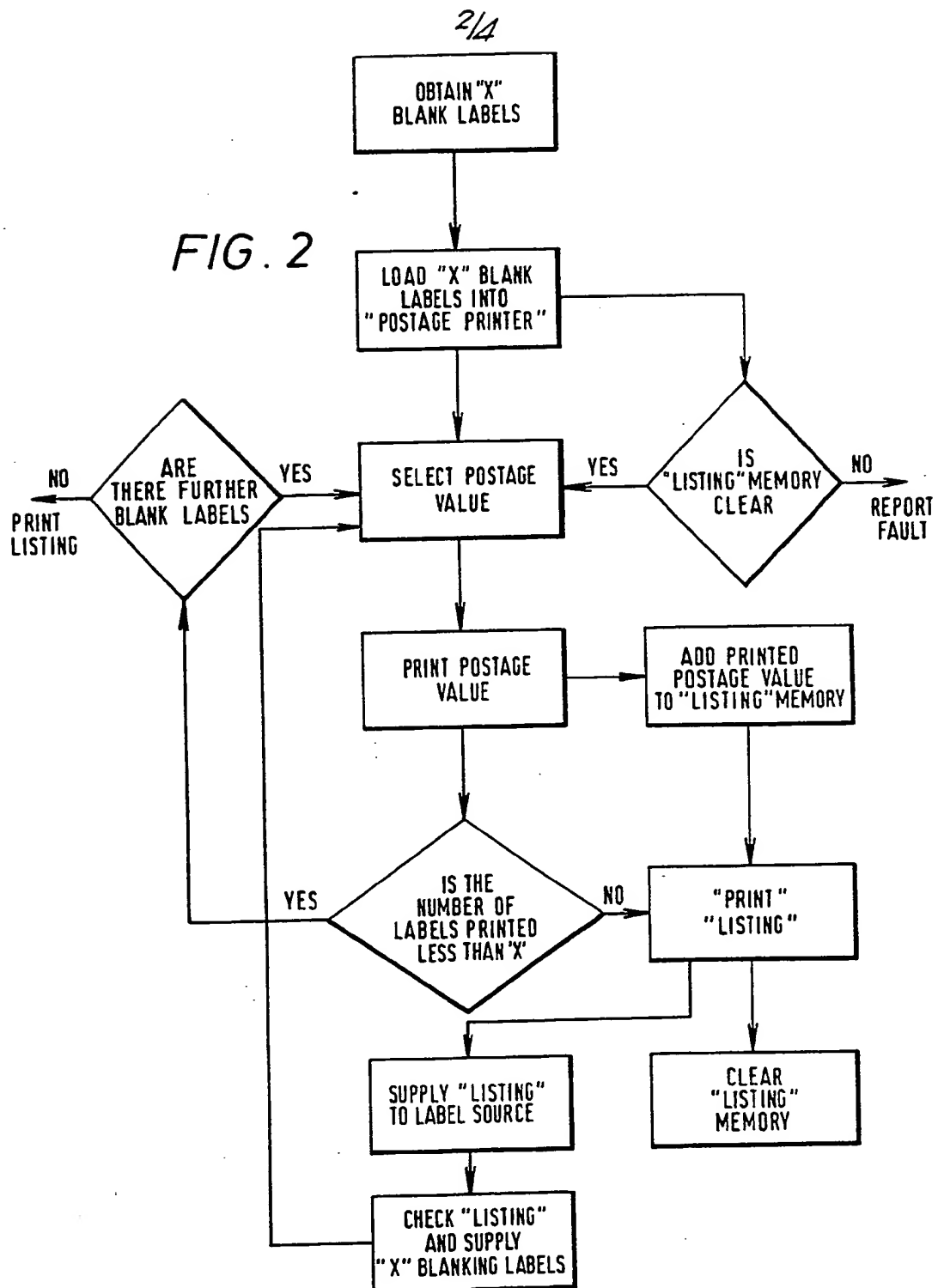
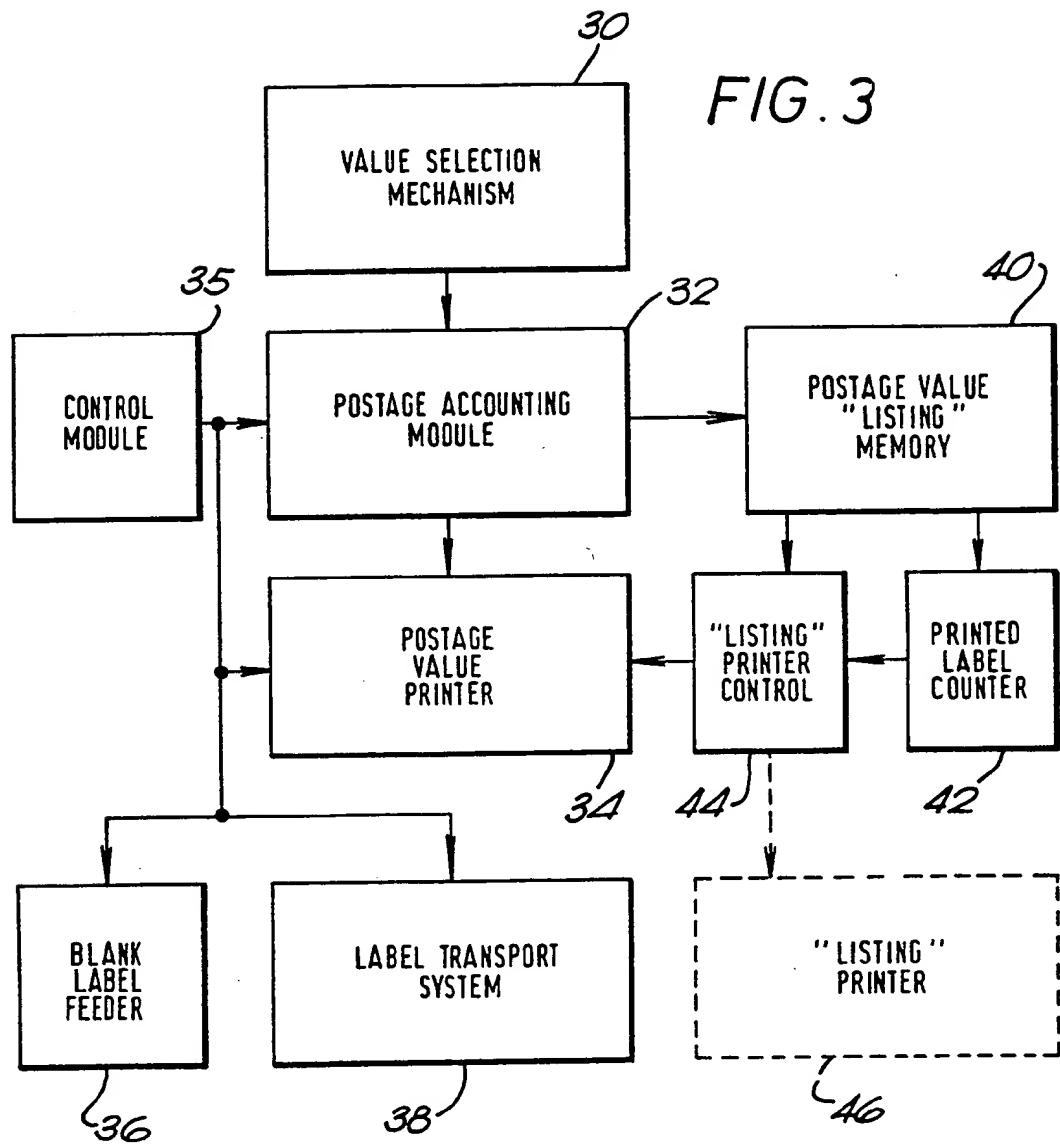
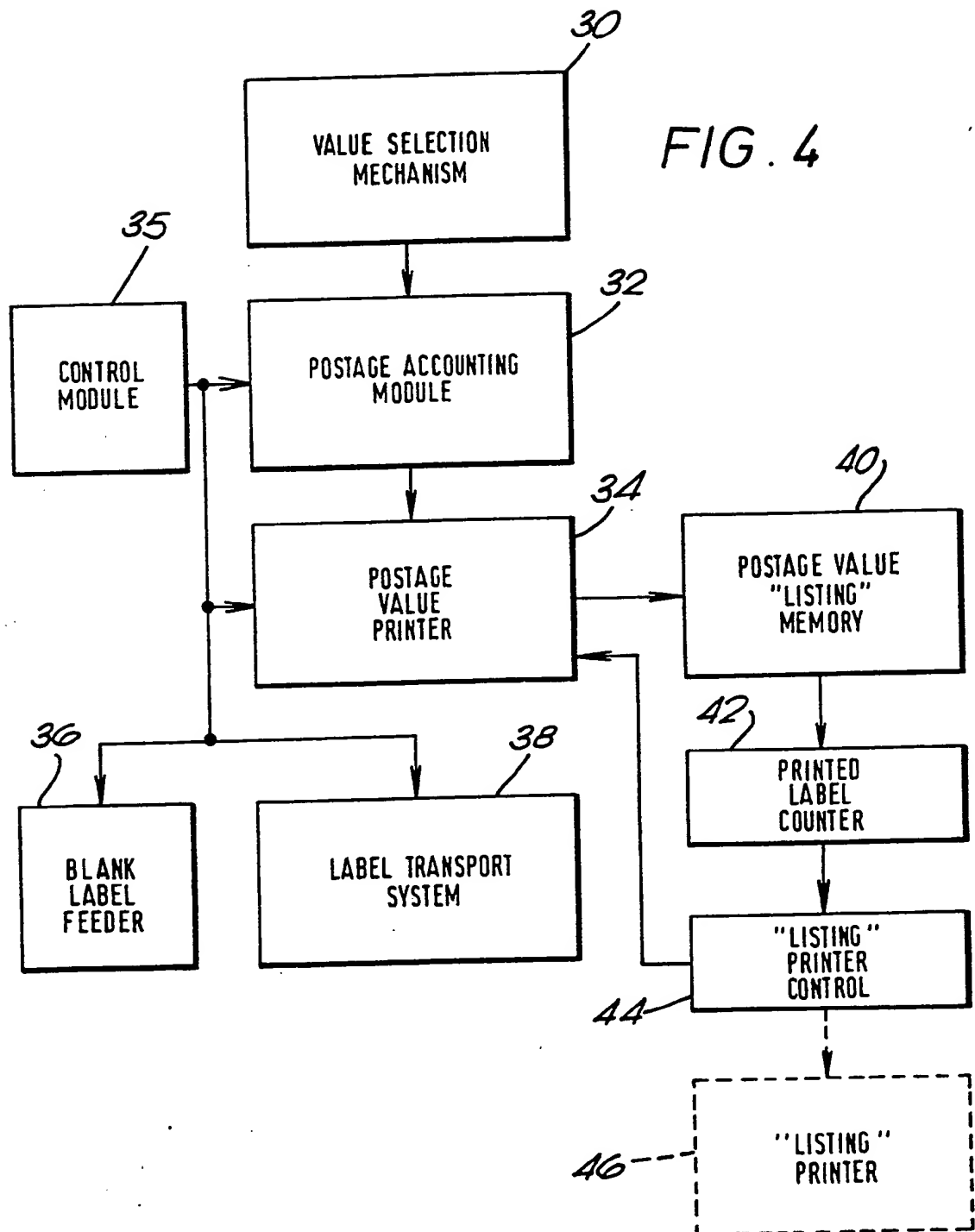


FIG. 3



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POSTAGE METER SYSTEMS

This invention relates to postage meter systems.

At present, the British Post Office requires users of postage meters to deposit mail franked by the meter with a single nominated post office within specified hours so that the Post Office could, if desired, conduct an audit to ensure that the aggregate postage value of all the mail franked by a particular meter has been accounted for in the accounting registers of the meter. Any fraudulent postage values franked by the meter would cause a discrepancy between the aggregate postage value of the franked mail and the value accounted for in the accounting registers.

Studies conducted by the applicants show that, both in U.K. and overseas, businesses which have a low volume of output mail are deterred from using postage meters because of the restrictions and regulations such as that discussed above which apply to the posting of mail. In addition, the applicants believe that the purchase of postage value could be made more widely available, for example in stationery shops selling greetings cards etc, if there was a postage meter system in which the authority responsible for monitoring use of the postage meters or other machines dispensing monetary value could be assured of receiving from the meter user a secure record of the values printed by the postage meter.

Furthermore, there are reasons why it would be useful if the postage printing facility of a postage meter system could be dissociated from the remainder of the system, i.e. the keyboard and accounting facilities. This would be advantageous in providing a compact portable meter which could more easily be taken to a Post Office for recharging. Also, dissociation of the postage printing facility means that there is more flexibility in choice of the kind of printing facility used, so that (for example) instead of using impression plates, printers incorporating thermal transfer ribbon may be used.

However, if the printer facility is to be dissociated from the remainder of the postage meter system, it is necessary for there to be a method of ensuring that all postage values printed by the printer facility are accounted for in the accounting part of the meter system.

A need exists for a postage meter system which incorporates means for enhancing the security of the collection and accounting of postal revenues printed by such postage meter systems so that a form of postage purchase can be achieved so that mailpieces processed by such systems may be posted anywhere at anytime.

Accordingly, in one aspect of this invention there is provided, in a postage meter system wherein a postage print means is operable to print postage value onto successive security labels from a batch thereof, a method of regulating the use of said system, which method comprises the steps of:

causing the postage meter system to output an output record comprising data representing the aggregate amount of postage printed by said postage print means, and

providing the user of the meter with a further batch of security labels only when the user provides the issuer of the labels with an output record including data representing the aggregate amount of postage printed by said postage print means on a previous batch of security labels.

In another aspect of this invention there is provided a postage meter system including:-

postage print means for printing postage value;

control means operable in response to an input signal to instruct said postage print means to print a required postage value;

postage accounting means for storing data representing the aggregate amount of postage value instructed to be printed, and

print record means for independently providing and storing in a memory data relating to the amount of postage value printed by said postage print means.

In another aspect of this invention there is provided a postage meter system, including:-

postage print means for printing postage value;

means for storing a batch of security labels in readiness for printing with postage value; and

sensor means associated with said print means and responsive to a predetermined characteristic of each of said security labels for preventing printing of postage value if the surface presented for printing does not possess said predetermined characteristic.

In another aspect of this invention there is provided a postage meter system including:

postage print means for printing postage value;

postage accounting means for storing data representing the aggregate amount of postage printed by said postage print means;

print record means for storing in electronic form data representing each individual postage value printed by said postage print means.

The invention will now be described by way of non-limiting example, reference being made to the accompanying drawings, in which:-

Figure 1 is a schematic block diagram illustrating the principle elements of an example of postage meter system according to this invention;

Figure 2 is a block diagram illustrating the general principles of operation of a postage meter system according to the invention;

Figure 3 is a block diagram illustrating an example of a postage meter system according to the invention in which the printer is securely linked to the postage meter;

Figure 4 is a block diagram illustrating an example of a postage meter system according the invention in which the printer is separate from the postage meter; and

Figure 5 is a schematic diagram showing how an independent listing of each of the values printed by the postage meter printer may be obtained.

Referring initially to Figure 1, an example of postage meter system according to the invention includes a postage meter 10 of generally conventional form including a keyboard 12 or other suitable means such as a datalink from a scale, for selecting the postage value to be printed, an accounting program 14 for decrementing and incrementing a descending and ascending register respectively (not shown) with the postage values entered via the keyboard 12, and a printer 16 for printing postage value.

As in conventional postage meters the postage meter 10 is configured so that the ascending and descending registers are decremented and incremented immediately before the printer 16 prints the postage value.

In contrast with conventional machines, the printer 16 does not print directly onto the mailpiece or onto a conventional adhesive label. Instead, the printer prints each postage value onto a security label 18 fed from a batch thereof. The security labels 18 include an area covered with a distinctive phosphor material; in other words they are "phosphor tagged". The phosphor material employed 24 is selected so that the production of effective counterfeit labels is very difficult, if not impossible. Other types of security label may be employed.

The postage meter 10 is also different from conventional postage meters in that it includes record output means 20 for providing an output record 21 identifying the postage value actually printed by

the postage printer 16. The output record 21 may be printed out in the form of a paper "hard copy" statement or "manifest" or it may be stored electronically either in the postage meter 10 itself or in an external store or memory. In any event, the output record is stored in such a way that it may be passed either physically or electronically to the authority 22 (e.g. a Post Office or the meter supplier) responsible for regulating use of the postage meter 10. The output record may and usually will indicate the number of labels which have been printed.

The principle of operation of the system schematically illustrated in Figure 1 is that mailpieces carrying postage values printed by the postage printer 16 of the postage meter are only accepted for mailing by the Postal Authority if the postage values are printed on a security label 18. The labels 18 are issued in batches 24 and may be obtained only from the authority 22. The authority 22 will only issue a new batch 24 of labels 18 if it has been supplied with an output record 21 identifying the postage printed on a previous batch 24 of labels 18. To allow for delays in transmission etc, the user of the postage meter may initially be supplied with two batches of labels and supplied with a fresh batch 24 of labels only when he provides a record 21 for the first batch. In this way, the user always has a spare batch available for use.

By this means it is possible to ensure that all security labels 18 are printed by the postage printer 16. It will be appreciated that security labels 18 printed by other machines do not appear on the output record and are not included in the total sum provided by the record output means 20. Also, in this instance, the count number supplied by the record output means would not agree with the number of labels provided in the batch.

In addition, by cross reference with the accounting registers of the postage meter 10, it is possible to ensure that the total aggregate amount of postage value printed has also been debited from the accounting registers of the postage meter.

The arrangement outlined above may be embodied in a number of ways. Conventional postage meters are required to have means which allow verification that the value printed is the same as the value accounted for. Such meters include a linkage between the accounting system or program 14 of the meter and the printer 16 of the meter which ensures that it is not possible to change the printed value without altering the accounted value. In such meters the data for the output record 21 may be extracted from the accounting system of the machine. The record output could be stored in an additional memory within the accounting system or in an external memory securely linked to the meter and securely protected (for example it may be stored in a so-called "Smart Card" with an encrypted communications package). "Smart Cards" are known and can be obtained from electronics firms in U.K., for example The General Electric Co. Ltd.

In another embodiment, not illustrated, a postage meter system includes a printer which is separate from the value setting and accounting components of the system. In this postage meter system it will be appreciated that the drive to the printer may not be secure and may be accessible by means other than the value setting system. Hence the meter could be used to print values not accounted for by the accounting system. In conventional systems of this type the accounting system may not therefore be totally relied upon to provide an accurate record of the values printed. In a system according to the invention, the printer is modified to incorporate a secure print value monitoring system. The print value monitoring system records and stores the values printed by the printer. As in the above example, the memory required to store the information for the output record or listing could be either internal to the printer or in an external memory securely linked to the printer (e.g. a Smart Card). These forms of storage would be electronic but it would also be possible to provide the output record in the form of a "hard copy" of the value printed at the time of each print. Alternatively, particularly where the printer is a thermal transfer printer, the output record could be in the form of the thermal transfer ribbon which would provide a negative image of the indicia printed by the printer.

In the above examples, the output record may take a number of forms, ranging from a complete listing of every print made to a simple summary comprising the total number of prints and the aggregate value of all of the prints and it is believed that an intermediate level summary format will be most appropriate for practical purposes. It is proposed that a number of alternatives would be available, for example a daily summary itemising the date, the number of prints and the daily value or a value summary which lists the postage values, the number of times each value is printed and the aggregate value of the prints. To assist exposure of fraud, it may be desirable to highlight the printing of "non-valid" impressions (i.e. values which do not correspond to values for postage in the current postal rate structure). A simple form of this could be the highlighting of printed values below the lowest valid value.

Referring now to the security labels used in the examples described above, most developed postal authorities now employ "phosphor tagging" of their stamps to enable cancelling of the mail by machine. This practice is complementary to the requirement of the above examples that the postage be printed on a secure label. This is because if the usage of postage meters is liberalised to allow posting of franked mail in other than nominated Post Offices, the franked mail will need to be faced (i.e. correctly oriented) and cancelled/dated when it enters the sorting system. From an operations viewpoint, the mail processed by the examples of systems described above should be "phosphor tagged". The unauthorised production of "phosphor tagged" labels will be more difficult than unauthorised production of optically recognisable labels and hence the security of the label will be considerably enhanced. Using known techniques, it is possible to provide a unique phosphor material or blend of phosphor materials which have predetermined characteristics e.g. wavelength, decay time etc. It is preferred for each label to incorporate both an optically distinct pattern and some form of phosphor tag.

To maximise security, it is proposed to supply batches of blank security labels within a special design of package or container which only permits access to the labels for printing when they have been loaded into the machine. In one arrangement, the package or container could comprise a form of sealed cassette that is opened by its entry or attachment to the postage printing machine.

By incorporating phosphor tags into the labels the difficulty of producing successful counterfeits is greatly increased. Additionally, the detection of counterfeit labels, (i.e. those not including the phosphor tags) is possible by means of automatic equipment which, in many countries, is already in place in the sorting offices to detect the stamp position and hence to allow the mail to be faced and cancelled. Detection of counterfeit labels may be enhanced further by pre-printing the security labels with part of the postage indicia. For example, it could be that the printer prints only the numerals and that the remainder of the indicia is pre-printed by or for the authority responsible for issuing the labels.

Use of phosphor material in the label also greatly increases the security of the system at a forensic level, since different types of such materials have distinctive and unique characteristics, as mentioned above, such as frequency absorption, frequency of emission, decay time etc. The Postal Authority or other responsible authority could act as the control source for the basic materials used.

The style and design of the printed numeric digits will follow established practice to minimise the possibility of alteration of the digits.

As discussed above printing of values onto valid labels by means external to the postage printer will be detected because the output record or listing from the postage printer will not account for all the labels issued. Protection against the use of non-authorised labels within the postage printer can also be achieved. The system must guard against a dishonest user of the system printing unauthorised labels with the minimum postage value and thus paying the minimum charge to the Post Office while the actual valid blank labels are printed at higher

values by another printer means. To prevent such fraud, the postage printer may include a valid label detection system (i.e. by sensing whether the label incorporates the predetermined phosphor tagging and/or optically distinct characteristic). Alternatively, as mentioned above, the labels could be supplied within a sealed cartridge which would be returned to the label issuing authority after use. Tampering with the seals would then be detectable.

The method of operation of examples of the system in accordance with the invention will now be described with reference to Figures 2 to 5.

Referring to Figure 2, the outline of operation of the arrangements of Figures 3 and 4 will be described. Users of the postage meter 10 obtain a batch 24 containing any desired number of (X) labels from the Post Office or Authority 22 and load them into the postage meter 10. The memory associated with the record output means 20 (the "listing" memory) is cleared. It may be arranged that insertion of this label batch causes an automatic clearing of this memory. The user is then allowed to select a desired postage value. The desired value is printed onto a blank label 18 and the value printed is added to the listing memory. A check is made of the number of labels printed and, if this is less than the number of labels supplied, then a check is made that further blank labels are available. If further blank labels are available, the user is free to select a further desired postage value. This process continues for a number of operating cycles until "X" printing operations have occurred or no further blank labels remain. When this occurs, the contents of the listing memory are printed and the listing memory is cleared. The listing is then returned as a hard copy by the user to the blank label source and, provided appropriate security checks are satisfied, a further batch of blank labels is supplied.

Figure 3 shows in block schematic outline an example of the invention incorporating a postage meter with an integral printer or with a printer securely attached thereto.

The meter comprises a value selection mechanism 30 coupled to an accounting module 32 and thence to the postage value printer 34. A control module 35 controls the feeding and transportation of blank labels via a blank label feeding unit 36 and a label transport system 38. The listing of postage values printed on a particular set of blank labels 18 is achieved by incorporating a postage value listing memory 40, a printed label counter 42 and a listing printer control module 44. The listing printer control module 44 is coupled either to the postage value printer 42 or to a separate dedicated listing printer 46. In the former case, the listing will be printed on the final label 18 of the batch 24. In the latter case, the term printer has been used loosely to describe a means of publishing the listing to the blank label supplier. This may take the form of a hard copy printout, an electronic printout in the form of a Smart Card memory or a link to a remote printer at the blank label supplier's office. In all three cases, the integrity and authenticity of the data is protected by means of encryption.

Figure 4 shows in schematic outline an example of a postage meter system in which the postage value printer is separate from the main accounting module. Many blocks of the system are similar to the system shown in Figure 3 and like blocks have been given like reference numerals. The system of Figure 4 differs from the arrangement shown in Figure 3 in that the postage value listing memory 40 takes the values directly from the postage value printer 34. These two units are either physically integrated within the same sealed housing or are securely connected via a communication channel whereby the authenticity of the data transferred is protected by means of encryption.

Referring to Figure 5, this shows an alternative arrangement whereby the listing is produced simultaneously with the printing of the value onto the postage label 18. Printing of the listing is achieved by means of an impact printer (not shown) via a ribbon (not shown) onto the upper surface of the listing paper roll 50. The pressure of the printer impact passes through the roll 50 and transfers ink either from the back of the roll 50 or from a secondary ribbon mounted behind the roll 50 onto the postage label blank 18. The current postage label value 52 is shown below the values 54 printed on the four preceding labels.

The arrangements disclosed above provide a system in which an accounting statement or listing is created which is based on the values actually printed by the printer. The accounting statement or listing provides enhanced security. The listing may be provided by the postage value printer printing the values onto a blank label or by means of a secondary, dedicated, printer. Alternatively the listing values may be stored electronically in an "electronic" memory either internal or external to the system, for later retrieval. In yet another arrangement, a telecommunications link may be provided between the postage meter and responsible authority so that the list can be communicated to a printer or computer located at the authority's office.

The arrangements disclosed above provide one or more of the following measures to prevent fraudulent printing of labels. The batch of blank labels may be supplied in a sealed cassette/cartridge and the postage meter may include a means for opening the sealed cassette/cartridge to allow release of blank labels. The postage meter may contain means identifying whether the label is a valid label either from its optical characteristics or the phosphor characteristics of any phosphor tagging.

As a further feature to enhance the security of this system, if a Smart Card is used, the Smart Card could contain part of the image data required to be printed by the postage meter so that, if a dishonest user attempted to print a security label without the Smart Card attached, only part of the image would be printed.

In this Specification including its Claims, the term "secure print record as herein defined" is intended to mean either a listing of the individual amounts of postage values that have been printed in a given period with or without the aggregate total, that is, a listing similar to a conventional "till roll" such as is obtained from a supermarket checkout, or the aggregate total value of what has been printed in the given period together with the number of printing operations carried out in that period.

CLAIMS

1. In a postage meter system wherein a postage print means is operable to print postage value onto successive security labels from a batch thereof, a method of regulating the use of said system, which method comprises the steps of:

causing the postage meter system to output an output record comprising data representing the aggregate amount of postage printed by said postage print means, and

providing the user of the meter with a further batch of security labels only when the user provides the issuer of the labels with an output record including data representing the aggregate amount of postage printed by said postage print means on a previous batch of security labels.

2. A postage meter including a value setting device and a printing means for printing onto successive security labels of a batch of such labels postage values respectively corresponding in amount to the values set in the setting device, characterised by a print record means which maintains at least a secure print record as herein defined, the print record means being associated with an output means connected to the print record means and which, in response to the number of printing operations reaching a predetermined number, provides an output signal, said signal being usable either for transmission to a remote control to trigger the issue of a further batch of security labels or for display at the meter to warn the meter operator that further labels are required.

3. A postage meter including a value setting device and a printing means for printing onto successive security labels of a batch of such labels postage values respectively corresponding in amount to the values set in the setting device, characterised by a print record means

which maintains at least a record of (a) the number of printing operations carried out since a given point in time and (b) the aggregate value of said printing operations, the print record means being associated with an output means connected to the print record means and which, in response to the number of printing operations reaching a predetermined number provides an output signal, said signal being arranged to effect a transmission to a remote centre to trigger the issue of a further batch of security labels.

4. A postage meter system including:-

postage print means for printing postage value;

control means operable in response to an input signal to instruct said postage print means to print a required postage value;

postage accounting means for storing in an accounting memory data representing the aggregate amount of postage value instructed to be printed, and

print record means for independently providing and storing in a print record memory data relating to the amount of postage value printed by said postage print means.

5. A postage meter system including:-

postage print means for printing postage value;

postage accounting means for storing data representing the aggregate amount of postage printed by said postage print means;

print record means for storing in electronic form data representing each individual postage value printed by said postage print means.

6. A postage meter system, including:-

postage print means for printing postage value;

means for storing a batch of security labels for being printed with postage value;

sensor means associated with the postage print means and responsive to a predetermined characteristic of each of said security labels, the sensor means being arranged to cause a prevention of printing of postage value if the surface presented for printing does not possess said predetermined characteristic.

7. A postage meter system according to claim 6, wherein said system includes container means for storing said batch of security labels, said container means being removably associated with said postage print means and being provided with means for preventing access to labels stored within said container means when said container means is removed from said postage print means.

8. A postage meter system according to claim 6, wherein said print record means is formed by a storage means associated with said postage accounting means.

9. A postage meter system according to claim 6, wherein said print record means has a storage means located externally of said postage accounting means.

10. A postage meter system substantially as hereinbefore described with reference to and as illustrated in any of the accompanying drawings.

11. A method of regulating the use of a postage meter substantially as hereinbefore described with reference to and as illustrated in any of the accompanying drawings.

12. Any and all novel features and combinations and subcombinations thereof substantially as described herein.